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Novel magnetically chitosan based N-heterocyclic carbene as recyclable nano-catalyst and highly efficient for cross-coupling reaction

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In this paper, novel magnetically chitosan@N-Heterocyclic Carbene-Palladium (NHC-Pd) coated Multi-Walled Carbon Nanotube (MWCNTs) was synthesized in three steps: (1) The reaction of Chitosan, glyoxal and formaldehyde for synthesis of chitosan@imidazol, (2) synthesis of magnetic functionalized-MWCNTs and (3) the esterification reaction via the reaction of hydroxyl and carboxylic acid groups of chitosan@imidazol and magnetic functionalized-MWCNTs respectively and followed with the attachment of palladium chloride to compose of novel NHC ligand for the first time. Catalytic studies of magnetic chitosan@NHC-Pd coated MWCNTs for the Suzuki cross-coupling reaction of various aryl halides with aryl boronic acids have been evaluated in the ethanol-water solution. In general, our new catalyst showed superior reactivity for this model reaction. Moreover, the heterogeneous catalyst can be easily recovered by external magnet field and reused for subsequent use without any significant loss in catalytic activity. The Suzuki-Miyaura cross-coupling reaction is important, synthetic transformations that are widely employed for the preparation of bi-aryl compounds in a great variety of industrial applications including the production of natural products, agrochemicals and pharmaceuticals. Challenges facing this reaction are the employ of catalysts that are efficient with higher Turnover Frequencies (TOF) and Turnover Numbers (TON), easily recoverable and can operate in environmentally benign solvents. Therefore, much recent effort has been searched and made approaches to develop efficiently heterogeneous Pd-catalyst systems.

Biography

Pourya Zarshenas has completed his BSc in 2013 from Shahid Beheshti University, Iran.

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